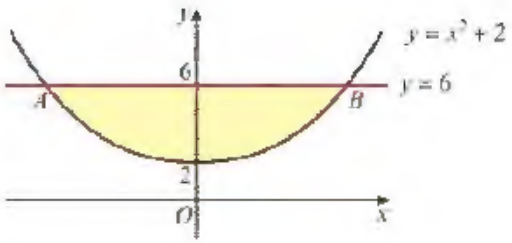
Exercise 13G

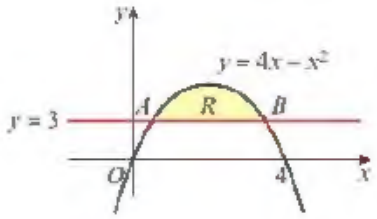
1 The diagram shows part of the curve with equation $y = x^2 + 2$ and the line with equation $y = 6$.
The line cuts the curve at the points A and B.



a Find the coordinates of the points A and B.

b Find the area of the finite region bounded by line AB and the curve.

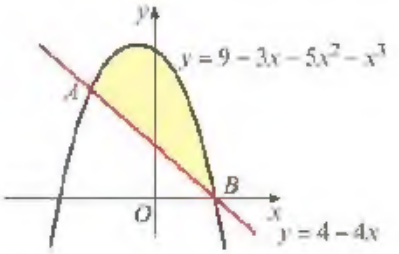
2 The diagram shows the finite region, R, bounded by the curve with equation $y = 4x - x^2$ and the line $y = 3$.
The line cuts the curve at the points A and B.



a Find the coordinates of the points A and B.

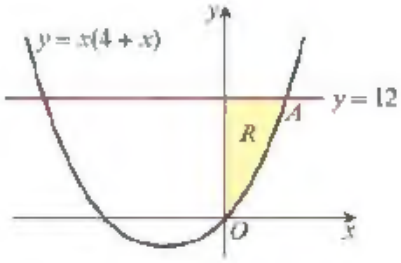
b Find the area of R.

P **3** The diagram shows a sketch of part of the curve with equation $y = 9 - 3x - 5x^2 - x^3$ and the line with equation $y = 4 - 4x$.
The line cuts the curve at the points $A(-1, 8)$ and $B(1, 0)$.
Find the area of the shaded region between AB and the curve.



P **4** Find the area of the finite region bounded by the curve with equation $y = (1 - x)(x + 3)$ and the line $y = x + 3$.

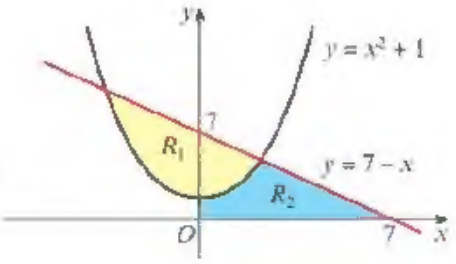
5 The diagram shows the finite region, R, bounded by the curve with equation $y = x(4 + x)$, the line with equation $y = 12$ and the y-axis.



a Find the coordinates of the point A where the line meets the curve.

b Find the area of R.

P **6** The diagram shows a sketch of part of the curve with equation $y = x^2 + 1$ and the line with equation $y = 7 - x$.
The finite region, R_1 is bounded by the line and the curve.
The finite region, R_2 is below the curve and the line and is bounded by the positive x- and y-axes as shown in the diagram.



a Find the area of R_1.

b Find the area of R_2.

(P) **7** The curve C has equation $y = x^{\frac{2}{3}} - \frac{2}{x^{\frac{1}{3}}} + 1$.

a Verify that C crosses the x-axis at the point $(1, 0)$.

b Show that the point $A(8, 4)$ also lies on C.

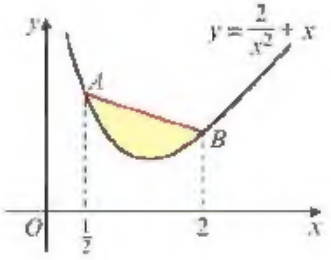
c The point B is $(4, 0)$. Find the equation of the line through AB.

The finite region R is bounded by C, AB and the positive x-axis.

d Find the area of R.

(P) **8** The diagram shows part of a sketch of the curve with equation $y = \frac{2}{x^2} + x$. The points A and B have x-coordinates $\frac{1}{2}$ and 2 respectively.

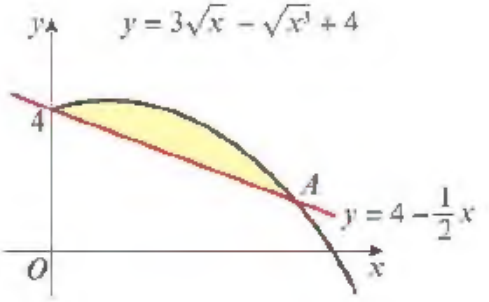
Find the area of the finite region between AB and the curve.



(P) **9** The diagram shows part of the curve with equation $y = 3\sqrt{x} - \sqrt{x^3} + 4$ and the line with equation $y = 4 - \frac{1}{2}x$.

a Verify that the line and the curve cross at the point $A(4, 2)$.

b Find the area of the finite region bounded by the curve and the line.

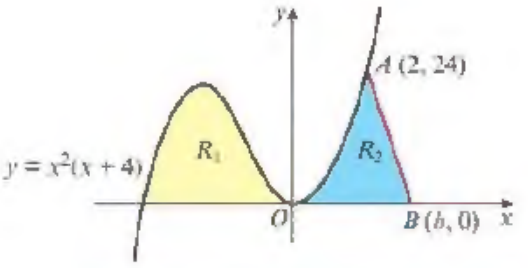


(P) **10** The sketch shows part of the curve with equation $y = x^2(x + 4)$. The finite region R_1 is bounded by the curve and the negative x-axis. The finite region R_2 is bounded by the curve, the positive x-axis and AB, where $A(2, 24)$ and $B(b, 0)$.

The area of R_1 = the area of R_2.

a Find the area of R_1.

b Find the value of b.



Problem-solving

Split R_2 into two areas by drawing a vertical line at $x = 2$.

(E/P) **11** The line with equation $y = 10 - x$ cuts the curve with equation $y = 2x^2 - 5x + 4$ at the points A and B, as shown.

a Find the coordinates of A and the coordinates of B. **(5 marks)**

The shaded region R is bounded by the line and the curve as shown.

b Find the exact area of R. **(6 marks)**